Formalized Consensus on Empty Nose Syndrome
French Society of Otolaryngology and Face and Neck Surgery
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The formalized consensus (CF) was chosen by the Société Française d´ORL for the theme of Empty Nose Syndrome (SNV) because:

- it is easily adaptable to concrete elementary clinical situations;
- the scientific data available in humans are scarce or discordant; there is a debate concerning this pathological entity among professionals and patients.

The Société Française d'Oto-Rhino-Laryngologie et de Chirurgie de la Face et du Cou translates to the French Society of Otolaryngology and Face and Neck Surgery)

Translated to English using Google Translate.

- Original French document can be found at this URL https://www.orlfrance.org/wp-content/uploads/2017/06/Syndrome_-nez_vide_2012.pdf

Section 1 – Methodology

This methodology is inspired by the "Methodological guide" published in January 2006 by the Haute Autorité de Santé concerning the “Methodological bases for the development of professional recommendations by formal consensus " (available on the HAS website at "http://www.hassante.fr"). The method chosen is called RAND / UCLA (“RAND appropriateness method ”), in its short version (without reading group). Choice of version short was dictated by the fact that this consensus conference was about a very targeted topic and that the experts of this topic are few. All CF participants signed a declaration of no conflict of interest.

1.1: The promoter

The promoter is the Société Française d'ORL. The targets concerned are ENTs, allergists, general practitioners, patients.No source of funding external to the Société Française d'ORL has been necessary for the development of this text.

1.2: The steering group

1.2.1 Members of the steering group

The members of the steering group of this formalized consensus are:

- Pr Elie Serrano (President), ENT department, Toulouse University Hospital
- Prof. Patrick Dessi, ENT department, CHU La Timone, AP-HM, Marseille
- Prof. André Coste, ENT department, Center Hospitalier Intercommunal de Créteil and CHU Henri Mondor (AP-HP)
- Prof. Vincent Couloigner, ENT department, Necker Hospital - Sick Children, APHP, Par

1.2.2 Roles of the steering group

Roles were:

- the logistical organization of the consensus conference
- the choice of members of the rating group
- the precise definition of the specific themes to be addressed
- the analysis of the literature and the writing of an argument supported by this analysis. The bibliography was made by consulting the database PubMed using the following keywords: "Empty", "Nose", "Syndrome", "turbinectomy", "nasal patency", "nasal obstruction surgery ”. The bibliographic list has been enriched as the reading the articles initially selected.
- the drafting of a first series of recommendations brought together in a questionnaire (see Appendix 1 on the progress of the different phases of consensus conference). A visual analogue rating scale ranging from 1 to 9 appeared next to each recommendation.
- Sending the sales pitch to the various members of the rating group and the questionnaire accompanied by an explanatory letter on the terms of filling out the questionnaire
- Analysis of quotations by specifying the following data:
    - For each level of agreement (from 1 to 9), number of members of the rating group having chosen this level;
    - Median level and extreme levels chosen by the members of the rating group;
    - For each question, classification in "strong agreement", "agreement relative ”and“ disagreement ”:

- we separate the response levels into 3 categories: (i) disapproval (level 1, 2 or 3 responses); (ii) indecision (level 4, 5 or 6 answers); (iii) approval of the proposal (level 7, 8 or 9 answers)
- if all the answers are in the same category of level, we say that there is strong agreement;
- if the answers overlap with two related categories (example: 5 to 9), we say that there is relative agreement;
- if some answers are located in the category "Approval" and others in "disapproval", we say that there is disagreement

Methodological details

1. Proposals for which there was disagreement at the end of the first quotation were collegially rediscussed. The content of such and such recommendation could be modified by the members of the steering group in order to to make it more consensual. These changes have been the subject of a new quotation by the quotation group.

2. For question n ° 9 (see below), the steering group eliminated from his analysis of two of the extreme responses, one minimal and the other maximal, to increase the likelihood of reaching agreement for the recommendation analyzed (procedure in accordance with the methodological guide published in January 2006 by the Haute Autorité de Santé available on the HAS website at the address "http://www.has-sante.fr").

3. There were no missing values in the responses to the questionnaires

1.3 The rating group

1.3.1 Members of the rating group

The members of the rating group chosen by the steering group are:

- Prof. Louis Crampette, ENT Department, CHU Montpellier
- Dr Loïc Taillandier de Gabory, ENT Department, Bordeaux University Hospital
- Dr François Coudert, ENT, 18 Bis Place Arts, 92500 Rueil-Malmaison
- Dr Josiane Percodani, ENT Department, Toulouse University Hospital
- Prof. Frédéric Chabolle, ENT Department, Foch Hospital, Suresnes
- Dr Joëlle Huth, ENT, Clinique du Parc: 26 rue Paul Louis Courier: F-24000 Perigueux
- Dr Justin Michel, ENT, CHU La Timone, HP-HM, Marseille
- Dr Jean-François Papon, ENT Department, Inter-Communal Hospital Center, Creteil
- Prof. Olivier Malard, ENT Department, Nantes University Hospital
- Prof. Laurent Castillo, ENT Department, CHU Nice

1.3.2 Roles of the rating group

The role of the rating group was to answer the questionnaire developed by the steering group according to the procedures described in paragraph 2.
Note: the original text of the bibliographic argument was published under form of literature review

Section 2 - Recommendations

Recommendation 1:
Nasal comfort is an individual and subjective notion that results from a balance between nasal permeability and the functions of humidification, warming and purifying the inspired air. Strong agreement

Recommendation 2:
Empty nose syndrome is a combination of a feeling of nasal obstruction, secretory changes and odor disturbances triggered by turbinal reduction surgery. Strong agreement

Recommendation 3:
In empty nose syndrome, psychological factors, which could in some cases pre-existing the initial surgery, sometimes exacerbate the poor tolerance of these symptoms, significantly impairing the quality of life. Strong agreement

Recommendation 4:
Empty nose syndrome is an exceptional complication of surgery turbinal (with regard to the number of procedures) which must nevertheless always be taken into account. Strong agreement

Recommendation 5:
In empty nose syndrome, nasal obstruction is said to be paradoxical because the changes in endonasal anatomy are accompanied by a large clinical permeability and reduced nasal resistance. Strong agreement

Recommendation 6:
The empty nose syndrome appears mainly in patients with multiple operations. Disagreement

Recommendation 7:
In empty nose syndrome, nasal and pharyngeal dryness, facial and nasal pain, sleep disturbances are often associated with clinical picture. Strong agreement

Recommendation 8:
In empty nose syndrome, impaired quality of life is accompanied often from anxiety, depression and chronic fatigue. Strong agreement

Recommendation 9:
Partial turbinectomy is only indicated if others have failed. medical or local treatment for nasal obstruction. Relative agreement

Recommendation 10:
For functional purposes, it is not recommended to remove the entire horn inferior. Strong agreement

Recommendation 11:
The treatment of empty nose syndrome primarily involves nasal hygiene measures, medical treatment and possibly prosthetics, psychological support if needed. Surgical treatment (reduction of nasal volume) is only offered in the event of proven failure of these measures. Its effectiveness is still poorly understood. Strong agreement

Section 3 - Bibliographic Argument (literature review)

All the articles cited in this argument are level 4 or Grade C (low level of scientific evidence). Described in 1994 by Kern and Moore [2], empty nose syndrome (SNV) is a controversial clinical entity some authors even go so far as to doubt its reality [3]. There is no consensual definition of SNV. It affects some nose and sinus surgery patients, mainly after turbinectomy lower. There remains a rare complication of these surgeries. It is characterized by the association of a symptomatology of atrophic rhinitis associated with a loss of normal endonasal anatomy, especially with the absence of one or more cones [4].

3.1 Definition – Impact

SNV is recognized as a secondary disorder, appearing up to several months or years after intervention on the inferior and / or middle turbinates [3]. He must be distinguished from atrophic rhinitis (or ozene) which is an affection primitive nasosinus structures of unknown origin but which share a close symptomatology.

The most common symptom of SNV is so-called paradoxical nasal obstruction, because alleged by the patient whereas objectively the nasal passages are largely permeable on clinical examination and no discernible barrier to imaging or rhinomanometry and acoustic rhinometry ([3], [5]).

Houser distinguishes several subtypes of SNV depending on the resected turbinate: inferior turbinate, middle turbinate, the two structures and a fourth type where the Turbine structures seem paradoxically normal [5].

The incidence of SNV remains unknown due to the lack of specific studies on the subject. Nevertheless, Chhabra and Houser estimate that SNV occurs in 20% of patients after resection of the inferior turbinate, an intervention that would only generate simple nasal dryness in many other patients ([3], [5], [6]).

Conversely, the very many series in the literature reporting the results turbinectomies or turbinoplasties (all techniques combined) do not almost never report SNV in complications. However, these series mention varying percentages of "failures", that is, of patients still with postoperative nasal obstruction while the anatomical result seems largely satisfactory.

3.2 Pathophysiology

The physiopathology of SNV remains unknown but several hypotheses complementary are found in the literature. SNV would result from the loss nasal physiological functions (humidification, warming and cleansing inspired air) by reducing the size of the mucous surface [7]. This loss of mucous surface results in a proportional loss of sensitive, tactile and thermal receptors [8], necessary for air treatment inspired. It was shown in the Shiethauer study [9] that patients with of SNV showed less humification, increased warming and decreased resistance to nasal airflow. The loss of these functions was assessed about 23% after turbinectomy [7] and [10].

Several studies clearly show that the significant reduction in the volume of inferior turbinate changes the airflow regimes in the nasal cavity favoring acceleration and increased flow in the lower part to the detriment of the upper part [4], [5] and [11].

These changes are responsible for impaired lung function. In In fact, nasal resistance plays a major role in opening the peripheral bronchioles and in the optimization of alveolar ventilation. This thus allows an improvement in gas exchange, an increase in negative chest pressure and improves cardiac venous return and pulmonary [5]. Thus, normal nasal resistance to expiration allows maintain lung volumes and indirectly determine oxygenation arterial [12].

These disturbances are the cause of the feeling of nasal obstruction described by patients, which can go to extremes to a feeling of suffocation.

The sensation of pharyngeal dryness, sometimes found, is linked to the passage of the air too little humidified by the nasal mucosa in the choanae which affects the nasopharyngeal mucosa [9].

The involvement of central mechanisms is under investigation. Indeed, the paradox between the congestion described by patients and the decrease in nasal resistance could be explained by a change in the rate of nasal patency or valences of nerve efferences originating from the nasal mucosa [7].

3.3 Role of turbinectomy in the onset of ENS

Atrophic rhinitis and SNV are late complications of turbinectomies. If large resections (total or sub-total turbinectomies) are the most at risk, cases of SNV after partial resection have been described [13]. These cases are mainly those of patients having benefited from a partial inferior turbinectomy involving the anterior portion or head of the horn, which plays a major role in the functioning of the internal valve.

Conservative surgeries (turbinoplasty, radiofrequency, etc.) are thus recommended after having given a formal indication (nasal obstruction resistant to well-conducted medical treatment in a patient with turbinal hypertrophy).

The amount of mucosa resected is not necessarily involved and we do not know currently predicting the risk of developing SNV.

Within SNV, we distinguish SNV after inferior turbinectomy (ENS-IT), after mean turbinectomy (ENS-MT) or both associated (ENS-both) [13].

SNV after inferior turbinectomy is the most common. These patients report as essential complaints, the paradoxical and important nasal obstruction mucous dryness. A hypothesis explaining the frequency of the obstruction after resection of the inferior turbinate would be linked to its role as a flow modulator nasal air.

SNV after mean turbinectomy remains a rarer entity. We would find in this syndrome, in addition to the signs of characteristic nasal obstruction, a pain when breathing, which could be caused by the lack of mucous membrane protecting the sphenopalatine ganglion [13]. SNV and atrophic rhinitis

SNV has long been related to a form of atrophic rhinitis, originating iatrogenic. The distinction between the two syndromes has however been clarified by some authors ([3], [13]). The paradoxical feeling of blockage, the dryness and scabs are symptoms described in both pathologies, which have
led to confuse them.

The risk of developing atrophic rhinitis after surgery including mucosal resection would not only be due to the amount of mucosa resected but also to personal and environmental factors not determined [14]. This risk is found in the literature as evaluated from 2 to 20% following turbinal surgeries.

Other associated factors

SNV only occurs in a limited number of patients who have had one or more several endonasal surgeries, which explains the current controversy over the reality of the existence of an organic pathology. The factors behind the development of the disease are only partially understood. One of the elements controversial is the frequent association of SNV with psychiatric disorders or pathologies which may be psychosomatic (fibromyalgia, colopathy functional…) ([4], [7], [10], [15], [16]). The possibility of a relationship between the psychological stresses undergone by some patients and the development of the pathology, as has been suggested for
tinnitus [4]. Neurological involvement in people with neuropathies could also explain the occurrence of disorders on these
particular land [17].

3.4 Diagnosis

Diagnosis of SNV is particularly difficult due to the lack of definition consensus, the variety of symptoms expressed and the context of psychological and sometimes social distress that accompanies these disorders. The diagnosis is clinical, based on the subjective symptomatology described by the patient and clinical examination based on endoscopy of the nasal cavity in consultation

3.4.1 Clinic

Subjective symptomatology

The characteristic symptom reported by patients is the sensation nasal obstruction ([3], [4], [5], [7], [13]) which may be associated with feelings of suffocation, shortness of breath, or difficulty in breathing. Others symptoms such as pain, a feeling of emptiness in the nose, or nasopharyngeal dryness are frequently described. Their intensity is variable and they can be the cause of limitation of daily activities [3]. So, patients with symptoms of SNV may present with difficulty concentrating (nasal aprosexia), fatigue, anxiety, irritability or depression.

Are also frequently related ([3], [5], [18], [19]):

- the feeling of excessive air flow;
- the absence of sensation of the nasal passage of air;
- hypersensitivity to cold air;
- dyspnea (also paradoxical), shortness of breath, hyperventilation;
- nasal pain of variable type, sometimes pseudoneuralgic;
- headaches

- nasal and pharyngeal dryness;
- difficulty falling asleep, general fatigue.

The use of SNOT-20 [20] or modified SNOT-25 [4] (Sino-Nasal Outcome Test), standardized questionnaire, based on 25 questions rated from 0 to 5, allows to help with the diagnosis of SNV and to judge the effectiveness of any therapies that can benefit the patient. The most frequent symptoms are the sensation of nasal obstruction, dyspnea, nasal dryness and pharyngeal, hyposmia and depression.

Physical examination

Physical examination shows permeable nasal passages, enlarged by the previous surgeries with missing or very diminished. The mucosa is usually pale and dry [4]. Crusts can be traced. Drought, which is an almost subjective complaint constant, is easily objectified during the examination.

Diagnostic test

A simple diagnostic and pre-therapeutic test is the cotton test ([3], [5]). A moist cotton ball is placed for 20 to 30 minutes in the nasal cavity, at the level the location of a possible implant. The improvement of symptoms during this test confirms the diagnosis of SNV and allows the patient to be offered Reconstructive surgery.

3.4.2 Paraclinical examinations

Imaging

If the diagnosis remains clinical, inconsistent and non-pathognomonic signs can, however, be found on imaging. Computed tomography of the sinuses shows a thickening of the rhinosinus mucosa and maxillary opacity present in more than 50%
cases ([14], [19], [21]).

Rhinomanometry

It is not of interest in the diagnosis of SNV [7]. She confirms generally the absence of obstacle by objectifying the normality or the weakness of nasal resistance [5].

Outlook

The study by Freund [7] and [22] on functional MRI showed a specific activation of the temporal, cerebellar and amygdala areas in patients with SNV.

Functional bronchopulmonary investigations

They are certainly useful in those who report symptoms. lower respiratory tract.
Bacteriological sampling It is also recommended in case of scabs and suppuration, it will guide a possible antibiotic therapy.

Cytological or anatomopathological analysis of the turbinal mucosa and the study of mucociliary function. Their indications remain to be determined.

3.5 Treatment

3.5.1 Prevention of SNV

Preservation of turbinates during endonasal, sinus and rhinoplasty is essential in order to minimize the risk of SNV [2]. The inferior turbinectomy is a frequently performed procedure, indicated in patients with nasal obstruction and in whom it is evident turbinal hypertrophy, unresponsive to medical treatment [23]. The surgical objectives have long been to achieve maximum resection in order to to optimize the volume gain in the nasal cavity. With the optimization of knowledge of the complications of total or subtotal turbinectomies, including the SNV, the current trend is towards conservative surgery.

The techniques currently [24] recommended are:

- laser [25] and electric cauterizations; partial turbinectomy, which must retain a minimum of 50% of the turbinal volume;
- submucosal turbinoplasty: it aims to reduce the volume turbinal to treat nasal obstruction without resecting the mucous membrane necessary for nasal functions. It consists of the excision of turbinal bone without associated mucosal resection;
- submucosal resection with the micro-debrider, which also allows the preservation of the mucous surface;
- radiofrequency [26], which does not give an SNV-type complication. The indications of any form of turbinal gesture must be scrupulously weighings and the use of functional explorations should become widespread

3.5.2 Surgical treatment

The goals of restorative endonasal surgery are to reduce the volume nasal cavity in order to increase resistance to airflow, reduce the air flow in order to increase the humidification of the air and finally to divert the flow air from the operated area to a healthy or non-surgical area [13]. Its principle lies in the placement of an implant placed on the septum, the floor or side wall [3], [19] and [27].

Endonasal microplasty

The creation of a neoturbine is one of the surgical solutions proposed for the SNV. The techniques vary between teams and the results are extremely encouraging ([18], [19]). The material chosen must involve a risk of extrusion, minimal rejection or infection and sufficient and well-tolerated restoration of volume in the nasal cavity. For this, the submucosal implantation of a graft of conchal or septal cartilage to recreate the volume of the inferior turbinate was performed [19]. The objective of this technique is to restore the surface mucosa allowing the physiological functions of warming, filtering and humidification of inspired air. Exogenous materials have also been proposed and satisfactory results are described in small series of the Empty nose syndrome 14 literature: hydroxyapatite [27], goretex ([18], [28]), teflon, plastipore. These materials do not appear to be rejected and allow a lasting increase volume of the neoturbine ([3], [5]). Hyaluronic acid gel, which is a injectable compound, also seems to be able to improve symptoms without further complication [18].

The amount of volume restored and how long the procedures last surgical elements are still debated ([5], [19]). Houser [5] described a filling technique by submucosal graft of

acellular dermis. The dermis is integrated within three to six months after the transplant and the volume obtained would allow a lasting effect. The results, although interesting, remain difficult to assess given the low numbers of different studies.
The indication must in all cases be carefully asked, and it seems to us essential that neuropsychological treatment precedes the decision taking into account the risk of aggravation of the psychological impact in the event of failure of this surgery.

These techniques are only possible if there is still a remainder of the cornet. In otherwise, the surgical issue is more complex. Medialization of the intersinusonasal septum or its increase in volume have been proposed. Medialization seems to give mixed results with frequent risk obstruction of the tear duct [26].

3.5.3 Medical treatment

Even if it is not codified, it is of course essential and always in order in first intention.
It can combine nose washes (salty serum, sulfur derivatives), ointments nasal moisturizers, directed antibiotics, aerosols, topical corticosteroids, but these treatments seem less effective in SNV than in atrophic rhinitis [19]. The addition of menthol to local treatments conventionally offered could improve the feeling of nasal obstruction [7].

Associated measures

Treatment should include follow-up in supportive psychotherapy for patients showing signs of depression and monitoring by an algotherapist when there is severe pain.

REFERENCES BIBLIOGRAPHIQUES

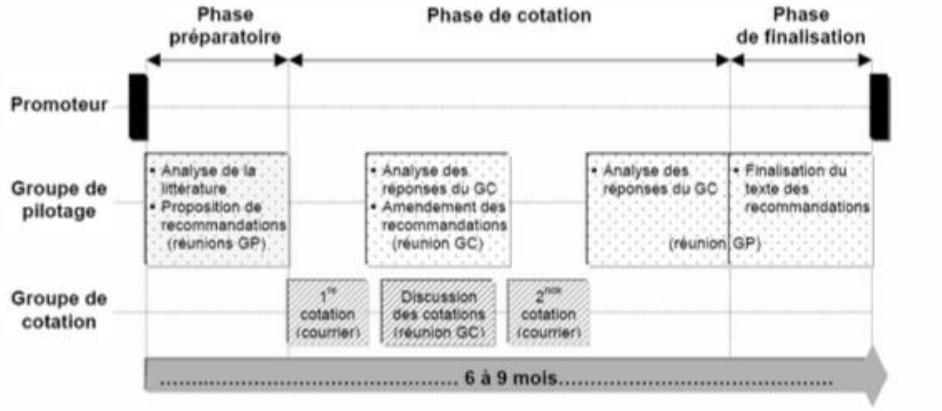
- [1] Coste A, Dessi P, Serrano E. Empty nose syndrome. Eur Ann Otorhinolaryngol Head Neck Dis. 2012; 129(2):93-7.
- [2] E.J. Moore, E.B. Kern. Atrophic rhinitis: a review of 242 cases. Am J Rhinol, 15 (2001), pp. 355–361
- [3] N. Chhabra, S.M. Houser. The diagnosis and management of empty nose syndrome. Otolaryngol Clin North Am, 42 (2009), pp. 311–330.
- [4] S.C. Payne. Empty nose syndrome: what are we really talking about? Otolaryngol Clin North Am, 42 (2009), pp. 331–337
- [5] S.M. Houser. Surgical treatment for empty nose syndrome. Arch Otolaryngol Head Neck Surg, 133 (2007), pp. 858–863.
- [6] N.D. Bhandarkar, T.L. Smith. Outcomes of surgery for inferior turbinate hypertrophy. Curr Opin Otolaryngol Head Neck Surg, 18 (2010), pp. 49–53.
- [7] W. Freund, A.P. Wunderlich, T. Stocker et coll. Empty nose syndrome: limbic system activation observed by functional magnetic resonance imaging. Laryngoscope, 121 (2011), pp. 2019–2025.
- [8] S. Naftali, M. Rosenfeld, M. Wolf et coll. The air-conditioning capacity of the human nose. Ann Biomed Eng, 33 (2005), pp. 545–553.
- [9] M.O. Scheithauer. Surgery of the turbinates and "empty nose" syndrome. GMS Curr Top Otorhinolaryngol Head Neck Surg, 9 (2010), Doc03.
- [10] H. Mertz, V. Morgan, G. Tanner et coll. Regional cerebral activation in irritable bowel syndrome and control subjects with painful and nonpainful rectal distention. Gastroenterology, 118 (2000), pp. 842–848.
- [11] D. Wexler, R. Segal, J. Kimbell. Aerodynamic effects of inferior turbinate reduction: computational fluid dynamics simulation. Arch Otolaryngol Head Neck Surg, 131 (2005), pp. 1102–1107.
- [12] A.C. Swift, I.T. Campbell, T.M. McKown. Oronasal obstruction, lung volumes, and arterial oxygenation. Lancet, 1 (1988), pp. 73–75.
- [13] S.M. Houser. Empty nose syndrome associated with middle turbinate resection. Otolaryngol Head Neck Surg, 135 (2006), pp. 972–973.
- [14] T. Hildenbrand, R.K. Weber, D. Brehmer. Rhinitis sicca, dry nose and atrophic rhinitis: a review of the literature. Eur Arch Otorhinolaryngol, 268 (2011), pp. 17–26.
- [15] K. Ren, R. Dubner. Descending modulation in persistent pain: an update. Pain, 100 (2002), pp. 1–6.
- [16] R.H. Gracely, F. Petzke, J.M. Wolf et coll. Functional magnetic resonance imaging evidence of augmented pain processing in fibromyalgia. Arthritis Rheum, 46 (2002), pp. 1333–1343.
- [17] M.R. Amin, J.A. Koufman. Vagal neuropathy after upper respiratory infection: a viral etiology? Am J Otolaryngol, 22 (2001), pp. 251–256.
- [18] M. Modrzynski. Hyaluronic acid gel in the treatment of empty nose syndrome. Am J Rhinol Allergy, 25 (2011), pp. 103–106.
- [19] Y.J. Jang, J.H. Kim, H.Y. Song. Empty nose syndrome: radiologic findings and treatment outcomes of endonasal microplasty using cartilage implants. Laryngoscope, 121 (2011), pp. 1308–1312.
- [20] J.F. Piccirillo, M.G. Merritt Jr., M.L. Richards. Psychometric and clinimetric validity of the 20-Item Sino-Nasal Outcome Test (SNOT-20). Otolaryngol Head Neck Surg, 126 (2002), pp. 41–47.
- [21] L. Berenholz, A. Kessler, S. Sarfati et coll. Chronic sinusitis: a sequela of inferior turbinectomy. Am J Rhinol, 12 (1998), pp. 257–261
- [22] W. Freund, A.P. Wunderlich, G. Stuber et al. Different activation of opercular and posterior cingulate cortex (PCC) in patients with complex regional pain syndrome (CRPS I) compared with healthy controls during perception of electrically induced pain: a functional MRI study. Clin J Pain, 26 (2010), pp. 339–347

- [23] M.O. Scheithauer. Surgery of the turbinates and "empty nose" syndrome. Laryngorhinootologie, 89 (2010), pp. S79–S102.
- [24]. D. Passali, M. Lauriello, M. Anselmi et coll. Treatment of hypertrophy of the inferior turbinate: long-term results in 382 patients randomly assigned to therapy. Ann Otol Rhinol Laryngol, 108 (1999), pp. 569–575.
- [25] E. Serrano, J. Percodani, E. Yardeni et coll. The holmium:YAG laser for treatment of inferior turbinate hypertrophy. Rhinology, 36 (1998), pp. 77–80
- [26] Y. Fischer, J. Gosepath, R.G. Amedee et coll. Radiofrequency volumetric tissue reduction (RFVTR) of inferior turbinates: a new method in the treatment of chronic nasal obstruction. Am J Rhinol, 14 (2000), pp. 355–360.
- [27] D.H. Rice. Rebuilding the inferior turbinate with hydroxyapatite cement. Ear Nose Throat J, 79 (2000), pp. 276–277.
- [28] P.R. Cook, A. Begegni, W.C. Bryant et coll. Effect of partial middle turbinectomy on nasal airflow and resistance. Otolaryngol Head Neck Surg, 113 (1995), pp. 413–419.

Annexe 2

NIVEAU DE PREUVE SCIENTIFIQUE FOURNI PAR LA LITTERATURE	GRADE DES RECOMMANDATIONS
Niveau 1 - Essais comparatifs randomisés de forte puissance - Méta-analyse d'essais comparatifs randomisés - Analyse de décision basée sur des études bien menées	**A** Preuve scientifique établie
Niveau 2 - Essais comparatifs randomisés de faible puissance - Études comparatives non randomisées bien menées - Études de cohorte	**B** Présomption scientifique
Niveau 3 - Études cas-témoin	**C**
Niveau 4 - Études comparatives comportant des biais importants - Études rétrospectives - Séries de cas - Études épidémiologiques descriptives (transversale, longitudinale)	Faible niveau de preuve scientifique

Annexe 1. Déroulement des différentes phases de la conférence de consensus (d'après le guide « Bases méthodologiques pour l'élaboration de recommandations professionnelles par consensus formalisé », disponibles sur le site internet de la HAS à l'adresse « http://www.has-sante.fr»)



NB : dans la cadre du présent travail, les différentes réunions et envois de texte ont eu lieu par conférences téléphoniques et courriels.